

Accurate Data from Hospital Discharge Records Are a Foundation for Injury Prevention Initiatives

Each year more than 36,000 Washington residents are hospitalized for injury and more than 3,000 die from injury. Trauma is the number one cause of death from age 1 to 44. Injury is also a costly health care problem that accounts for more than \$500 million per year in hospital charges alone. Accurate data on injury morbidity and mortality are essential to identify and prioritize public health interventions.

Injury codes in hospital discharge records serve as the primary means for estimating injury morbidity in Washington. The Injury Prevention Program of the Department of Health recently evaluated the accuracy of injury coding in hospital discharge records. The study focused on codes for the agents or mechanisms for external causes of injury (commonly

referred to as E-Codes) as described in the International Classification of Diseases, Clinical Modification. The objectives of this study were to:

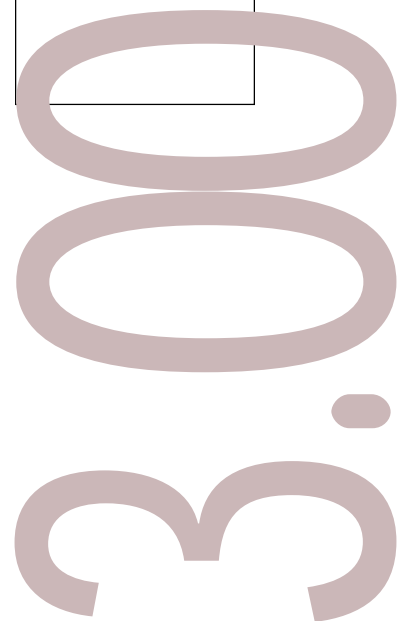
- Determine how accurately hospital discharge data describe the distribution and the relative magnitude of specific types of injury.
- Assess how accurately hospital-supplied E-Codes describe mechanism of injury (e.g., motor vehicle, firearm, poisoning), intent (unintentional, suicide, assault), and detail the circumstances (driver vs. pedestrian injuries in motor vehicle crashes, firearm injuries involving handguns vs. rifles, specific types of drugs involved in poisonings).
- Identify actions that could improve the quality of the data. *Continued page 2*

Bioterrorism Preparedness in Washington

Events over the past few years, such as the World Trade Center bombing, the Oklahoma City bombing, and the sarin nerve gas release in the Tokyo subway have heightened concern about potential terrorist attacks in general and bioterrorist attacks in particular. In the past year, local public health leaders in more than a dozen communities have had to deal with claims about the release of bioterrorist agents in their areas. Last year in Washington, anthrax threats occurred in King and Spokane counties.

A grant from the Centers for Disease Control and Prevention (CDC) has enabled the Department of Health to respond to this emerging issue. DOH will increase surveillance and laboratory capacity to recognize and test for bioterrorist agents, add security to Internet communications between the state and local health jurisdictions (LHJ), and will provide bioterrorism preparedness training to LHJ. A state coordinator and coordinators in King and Spokane counties are developing materials to assist other health districts.

Recognition of a bioterrorism event relies upon maintenance of strong communicable disease surveillance and epidemiology capacity in local and state health departments. Early recognition of an event is critical to minimizing its impact, and health care providers will play a key role by recognizing and reporting unusual disease occurrences to their LHJ. The Association of Professionals in Infection Control, in cooperation with CDC, has created a reference document to raise awareness and facilitate preparation of bioterrorism readiness plans that include an overview of infection control activities and disease-specific information on smallpox, anthrax, plague, and botulism. This document is available at <http://www.cdc.gov/ncidod/hip/Bio/13apr99APIC-CDCBioterrorism.pdf>. *Continued page 4*



Injury Codes *(from page 1)*

In a prior study, the DOH Injury Program ascertained that 98% of hospital records with a principal diagnosis of injury (e.g., concussion, broken leg) also reported an external cause of injury code. However, the accuracy of these E-codes had not been evaluated until now.

Sample Selection and Analysis

The DOH study sampled 1260 E-Coded hospital discharge records from the 1996 hospital discharge data file provided by the DOH Office of Hospital and Patient Data. The records came from 32 Washington hospitals that accounted for 80% of all injury-related hospitalizations in 1996. Poison- and firearm-related injuries, the types most likely to be intentional, were oversampled to ensure a sufficient number of intentional injuries to allow for meaningful analysis of intent coding. A medical record expert used on-site review of hospital records to assess the accuracy of hospital discharge data.

Findings

Table 1 presents observed and expected counts of injuries by mechanism and intent based on comparison data from medical

records. The total count was within 1% of the expected counts. Closer examination of the data showed that the accuracy of injury classification varied by mechanism and intent. Hospital discharge data overestimated motor vehicle traffic injuries by about 10%. Most errors resulted from using motor vehicle traffic codes for injuries that should have been coded to some other mechanism such as off-road injuries.

Hospital discharge records also tended to overuse the "other" and "unspecified" injury categories. Approximately 20% of injuries assigned to these categories could have been coded to a specific mechanism. Of particular concern, nearly 20% of hospitalizations due to late effects of injury were misclassified as acute injuries. This kind of error can lead to inflated estimates of the number of injuries occurring in Washington.

The agreement between hospital discharge records and comparison records was 86% for mechanism of injury and 96% for intent of injury. This finding was encouraging because mechanism and intent of injury are the two types of information most often used for injury-related analyses and program development work conducted by the DOH injury program and other professionals.

The level of agreement on detail coding was substantially lower (66%), which suggests a need for caution in interpreting and using data derived from the individual E-Codes. The observed problems with detail codes varied for specific mechanisms of injury. For example, for motor vehicle traffic injuries, the hospital discharge data lacked the precision needed to estimate injuries for pedestrians, motorcyclists, and bicyclists hit by cars. For poisonings, the hospital discharge data did not accurately identify specific drugs. For firearm injuries, gun type was frequently misclassified and the role of handguns in these injuries could not be accurately measured.

Recommendations

Recommendations to improve the quality of the coding include:

- more complete documentation of circumstances by health care professionals.
- improved clarity in coding guidelines.
- additional training of medical records personnel for coding external cause.

For More Information

For more information contact Mary LeMier, assessment coordinator, DOH Office of Community Wellness and Prevention, 360-236-3693 or by email, mary.lemier@doh.wa.gov

TABLE 1: Injury data from 32 study hospitals representing 80% of injury hospitalizations, 1996

	Observed Count Hospital Discharge Data	Expected Count Comparison Data	Observed/Expected Incidence Ratio (95% CI)
Mechanism of Injury			
Total all categories	29,693	29,374	1.01 (1.00, 1.02)
Falls	12,779	12,534	1.02 (0.99, 1.05)
MV traffic	4,176	3,748	1.10 (1.03, 1.18)
Poison	2,949	2,802	1.05 (1.01, 1.09)
Struck	1,162	1,236	0.94 (0.75, 1.12)
Cut	973	906	1.07 (0.90, 1.24)
Overexertion	722	689	1.05 (0.72, 1.37)
Transport	565	688	0.78 (0.52, 1.03)
Machinery	377	452	0.80 (0.60, 1.00)
Firearm	370	378	0.98 (0.82, 1.14)
Other & unspecified	1,946	1,537	1.21 (0.94, 1.48)
Late effects of injury	2,355	2,749	0.83 (0.72, 0.94)
Intent of Injury			
Unintentional	25,761	25,275	1.02 (1.00, 1.03)
Suicide	2,531	2,375	1.06 (0.99, 1.13)
Assault	1,181	1,276	0.92 (0.80, 1.04)
Other & undetermined	219	323	0.52 (0.15, 0.90)

Monthly Surveillance Data by County

February 2000* – Washington State Department of Health

County	E. coli O157:H7	Salmonella	Shigella	Hepatitis A	Hepatitis B	Non-A, Non-B Hepatitis	Meningococcal Disease	Pertussis	Tuberculosis	Chlamydia	Gonorrhea	AIDS	Pesticides†	Lead\$#
Adams	0	0	0	0	0	0	0	0	0	2	1	0	0	0/#
Asotin	0	0	0	0	0	0	0	0	0	1	0	0	0	0/#
Benton	0	0	0	0	0	0	0	0	0	13	0	1	1	0/33
Chelan	0	0	1	1	0	0	0	0	0	11	0	0	0	1/8
Clallam	0	0	1	0	0	0	0	0	0	7	0	0	1	0/#
Clark	0	0	1	0	0	0	0	0	1	44	9	0	0	0/6
Columbia	0	0	0	0	0	0	0	0	0	0	0	0	0	0/0
Cowlitz	0	0	0	0	0	0	1	0	0	3	2	1	0	2/28
Douglas	0	0	0	0	0	0	0	0	0	0	1	0	0	0/0
Ferry	0	0	0	0	0	0	0	0	0	1	0	0	0	0/0
Franklin	0	0	1	0	0	0	0	0	1	18	0	0	0	0/#
Garfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0/0
Grant	0	0	0	3	0	0	0	0	0	13	1	0	0	0/5
Grays Harbor	0	0	0	0	0	0	0	0	0	7	0	1	1	1/7
Island	0	0	1	0	0	0	0	0	0	0	1	0	0	0/6
Jefferson	0	0	0	0	0	0	0	0	0	5	0	0	1	0/#
King	0	6	53	6	1	0	0	11	9	327	67	5	1	2/83
Kitsap	0	1	13	0	0	0	0	0	1	43	13	1	0	0/18
Kittitas	0	0	1	0	0	0	0	0	0	7	0	0	0	0/#
Klickitat	0	0	0	0	0	0	0	0	0	8	0	0	0	0/0
Lewis	0	0	0	0	0	0	0	0	0	12	2	1	0	0/#
Lincoln	0	0	1	0	0	0	0	0	0	0	0	0	0	0/0
Mason	0	0	2	0	0	0	0	0	0	7	1	1	0	0/0
Okanogan	0	1	0	0	0	0	0	0	0	12	0	1	0	0/#
Pacific	0	0	0	0	0	0	0	0	0	0	0	0	0	0/#
Pend Oreille	0	0	0	0	0	0	0	0	0	0	0	0	0	0/#
Pierce	0	4	23	1	4	1	0	1	3	174	46	6	1	0/42
San Juan	0	0	0	0	0	0	0	0	0	0	0	1	0	0/0
Skagit	0	0	0	1	0	0	0	0	0	10	0	0	0	0/5
Skamania	0	0	0	0	0	0	0	0	0	0	0	0	0	0/0
Snohomish	0	2	15	2	0	0	0	0	2	73	8	0	0	1/21
Spokane	0	0	0	0	0	0	0	1	0	52	11	1	0	0/11
Stevens	0	0	0	0	0	0	0	0	0	3	0	0	0	0/#
Thurston	0	2	7	0	0	0	0	0	0	27	1	4	0	0/5
Wahkiakum	0	0	0	0	0	0	0	0	0	0	0	0	0	0/0
Walla Walla	0	0	0	1	0	0	0	0	0	10	0	0	0	0/6
Whatcom	0	1	2	1	0	0	0	0	0	21	0	1	0	0/#
Whitman	0	0	0	0	0	0	0	0	0	1	0	0	0	0/#
Yakima	0	1	1	1	0	0	0	0	0	55	2	2	0	1/20
Unknown														0/0

Current Month	0	18	123	17	5	1	1	13	17	967	166	27	6	8/326
February 1999	1	32	8	43	2	1	3	9	23	921	148	29	3	8/339
2000 to date	1	23	126	19	5	2	3	13	31	1911	365	69	18	18/561
1999 to date	1	34	9	47	2	2	6	11	40	1921	333	55	6	19/728

* Data are provisional based on reports received as of February 29, unless otherwise noted.

† Unconfirmed reports of illness associated with pesticide exposure.

\$# Number of elevated tests (data include unconfirmed reports) / total tests performed (not number of children tested); number of tests per county indicates county of health care provider, not county of residence for children tested; # means fewer than 5 tests performed, number omitted for confidentiality reasons.



WWW Access Tips

The National Association of Medical Examiners offers a tutorial on how to certify cause of death: <http://www.thename.org/main.htm>

The National Center for Health Statistics provides instructions for completing the cause-of-death section on death certificates: <http://www.cdc.gov/nchswww/about/major/dvs/handbook.htm>

Information Resource

A Physician's Handbook on Birth, Fetal Death, and Death Registration is available free by calling the Washington State Department of Health, Center for Health Statistics, 360-236-4300.

New ICD-10 Codes Will Enhance Public Health Monitoring

The tenth revision to the World Health Organization International Classification of Disease (ICD-10) was implemented nationwide in January 1999 to reflect advances in medical science and diagnoses. ICD-10 has roughly 8,000 codes for classifying causes of death, twice as many as ICD-9. Increasing the number of codes will permit more detailed tabulations of cause of death and could enhance the ability to monitor public health and plan intervention strategies.

Physicians, coroners, and medical examiners should report the most specific condition that began the sequence of events that caused the death. It is difficult to plan public health strategies based on reports of ill-defined conditions such as heart failure or heart disease. Thus, physicians should report exact information about antecedent causes such as high blood pressure, diabetes (and insulin-dependence), cancer (by primary site and histology), or other specific diseases.

ICD-10 also has more codes specific to the decedent's age and that pertain to late effects of prior injuries or disease. Physicians also are advised to report the duration of each condition or the interval between the onset of different conditions.

See the side column for information resources about ICD-10 and how to complete death certificates. For other questions or to arrange for training at your location, contact Ann Lima, state nosologist at the Center for Health Statistics, Washington State Department of Health, 360-236-432, or by email, ann.lima@doh.wa.gov.

Many Uses for Cause-of-Death Data

Cause-of-death data is important for public health surveillance, medical research, design of interventions, and funding decisions for research and development. Information from the death certificate is used by state and local health jurisdictions, university researchers, nonprofit organizations, private foundations, other state agencies, and the federal government for health assessment, disease and injury prevention, health promotion, population estimates, and child death review activities. The death certificate system provides the basis for case control studies and other epidemiological work that is essential to improving the health of the public.

Bioterrorism *(from page 1)*

Although the possibility of a bioterrorist attack is remote, the results could be catastrophic and would require major inter-agency coordination. These preparedness activities will be important tools for responding to other natural biological disasters and emergencies such as an influenza pandemic or large outbreaks of endemic diseases and new emerging diseases.

For more information, contact Julie H. Wicklund, M.P.H., at 206-361-2881; fax 206-361-2930; email, julie.wicklund@doh.wa.gov

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